CLAIMS

1. Method for performing measurements of a topography of a surface, such as the topography of an eye surface, wherein an image is projected onto said surface from at least one projection light source using projection means, wherein at least a fraction of light leaving the surface as a result of said projection is received using one or more receiving units, such as charged coupled device (CCD) based cameras, and wherein the topography of the surface is determined by analysis of said fraction of light leaving the surface, characterised in that, said fraction of light leaving the surface is comprised of light radiated by the surface due to thermal emission and wherein said analysis is performed on said light radiated by the surface due to thermal emission.

2. Method according to claim 1, wherein at least one of the receiving units only receives said fraction of light leaving the surface during thermal excitation of the surface.

3. Method according to any of the previous claims, wherein said fraction of the light leaving the surface further comprises excitation light that is radiated by the surface due to excitation of surface matter, and wherein said excitation light is removed before said analysis of said fraction of light leaving the surface.

4. Method according to any of the previous claims, wherein the surface is at least part of the surface of a human or animal eye.

5. Method according to any of the previous claims, wherein the image projected onto the surface is projected with light comprising a colour for which the surface is opaque.

6. Method according to claim 5, wherein said colour for which the surface is opaque corresponds to a colour of infrared (IR) light.

7. Method according to claim 6, wherein mid-IR light is used for projecting said image on the surface.

8. Method according to any of the previous claims, wherein said projection means flashes the image onto the surface, and wherein at

least one of said receiving units is synchronised with said projection means.

9. Method according to claim 8, wherein said projection means projects the image during a series of flashes onto the surface, enabling determination of dynamics of the topography of the surface.

10. Method according to any of the claims 7 and 8, wherein said fraction of the light leaving the surface comprises excitation light that is radiated by the surface due to excitation of surface matter, and wherein said excitation light is used to synchronise the at least one of said receiving units.

11. Method according to any of the previous claims, wherein illumination of the surface by an ambient light source enables detection of references on or underneath the surface using said one or more receiving units.

12. Method according to claim 11, wherein said ambient light source radiates light of a colour for which the surface is at least partly transparent.

13. Method according to any of the claims 11 and 12, wherein the surface is at least part of an eye surface, and wherein the light radiated by said ambient light source is near-IR light.

14. Method according to any of the previous claims, wherein a plurality of receiving units are used for receiving said fraction of light leaving the surface, wherein said receiving units are arranged for receiving a desired image of said fraction of light at a fixed distance from said surface, and wherein placing the surface at said fixed distance for receiving the desired image at least comprises the steps of:

- projecting a plurality of references onto the surface along an optical path using reference projection means, which references are projected such that at least one of the optical paths of said reference projection means is at an angle with at least one other of said optical paths of the reference projection means, and such that if the references are projected on the surface at said fixed distance to the

receiving units, a recognisable pattern is formed on the surface by said references,

- adjusting the distance between surface and receiving units such that said references form said recognisable pattern on the surface.

15. Method according to claim 14, wherein near-IR light is used for projecting said references onto the surface.

16. Method according to any of claims 14 and 15, wherein the surface is an eye surface comprising a corneal surface, and wherein pupil, iris and conjunctiva are comprised underneath said surface, and wherein said more than one reference is projected onto a region of the conjunctiva outside a region of the corneal surface.

17. Method according to any of the previous claims, wherein said image projected onto the surface is an interference pattern provided by any of a group of a grid, a slit, a double slit, an interferometer, and other means for creating an interference pattern.

18. Method according to claim 17, wherein said interference pattern used is a sinus shaped fringe pattern.

19. Method according to any of the previous claims, wherein a Moiré method, Fourier analysis methods or other profilometric methods are used for determining the topography of the surface.

20. Arrangement for performing measurements of the topography of a surface, such as topography of an eye surface, comprising projection means, which projection means comprise at least one projection light source for projecting an image onto the surface, further comprising one or more receiving units for receiving at least a fraction of light leaving the surface as a result of said projection, such as charged coupled device (CCD) based cameras, and means for analysis of said fraction of light leaving the surface to determine the topography of the surface, characterised in that, said analysis means are arranged for analysing light radiated by the surface due to thermal emission.

21. Arrangement according to claim 20, further comprising

filtering means for filtering said fraction of light leaving said surface, said filtering means being arranged for transmission of light that is radiated by the surface due to thermal excitation.

22. Arrangement according to any of the claims 20 and 21, wherein said projection means are arranged for flashing said image onto said surface.

23. Arrangement according to any of the claims 22, comprising means for limiting a period of time for which at least one of said receiving units receives said fraction of light leaving the surface such that said period of time is approximately the duration of thermal emission as a result of said flashed image on said surface.

24. Arrangement according to any of the claims 20-23, wherein said projection light source emits light of a colour for which the surface is opaque.

25. Arrangement according to claim 24, wherein said colour for which the surface is opaque corresponds to a colour of infrared (IR) light.

26. Arrangement according to claim 25, wherein mid-IR light is used for projecting said image on the surface.

27. Arrangement according to any of the claims 20-26, comprising means for synchronising said receiving units with said projection means.

28. Arrangement according to any of the claims 20-27, further comprising an ambient light source and means for detecting references on said surface.

29. Arrangement according to claim 28, wherein said ambient light source comprises a near-IR light source.

30. Arrangement according to any of the claims 20-29, comprising a plurality of receiving units, and further comprising means for projecting more than one reference onto the surface, and means for constructing a composite image from images received by said receiving units.

31. Arrangement according to any of the claims 20-30, wherein said projecting means comprises means for projecting an interference pattern onto said surface.